Paired Counting within Slice-of-Day

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Today's Agenda

- **Standing Issues**
  - Accounting for efficiency of standalone storage
  - Resource Master Dataset
- **The Status Quo and its Limitations**
  - Market participation pathways for paired resources
  - The current paired qualifying capacity (QC) methodology
- **Modifications under Slice-of-Day (SOD)**
  - Use of exceedance
  - Considering additional configurations
  - Accounting for energy sufficiency and efficiency losses
- **Other issues**
  - Partial deliverability and charging sufficiency verification

Standing Issues – Standalone Storage Efficiency

- **Accounting for efficiency of standalone storage**
  - Efficiencies are already considered in CASIO data set in an interrelated manner that affects the maximum continuous energy limit (MWh) available for dispatch to ensure feasible dispatch
  - Pulling from data sources such as the Masterfile could result in inaccurately representing the asset since efficiencies are already considered
    - The maximum continuous energy limit (MWh) available for dispatch already accounts for the energy that will be lost in the charge and discharge side
      - If RTE was applied to this value, it would risk double- or even triple-counting efficiency losses
    - Many developers already develop their resources in a manner consistent with the RA product sold, accounting for efficiency losses and gradual degradation
      - CAISO has confirmed that the max MWh already considers losses

Standing Issues – Resource Master Dataset

- **Resource Master Dataset**
  - During the last Workstream meeting, Southern California Edison (SCE) presented on the data needed to show an asset for RA purposes, as well as potential sources for this information
    - CESA believes that using sources such as the Masterfile is not desirable, as it could create significant inaccuracies and complexities:
      - Using data form the Masterfile may ignore the fact than an asset can sell only fractions of its capacity for RA
      - Storage developers typically oversize their projects to ensure delivery of the product sold over the delivery term including offsetting degradation
      - Data within the Masterfile already takes into account important factors, such as efficiency

Standing Issues – Resource Master Dataset

- **Resource Master Dataset**
  - Instead, CESA recommends that the parameters needed for showing and validation should be sourced from the bilateral RA contracts the showers (LSEs) have entered into:
  - For storage, the critical values include:
    - Maximum power output sustainable over the non-contiguous number of hours shown (MW)
    - Maximum continuous energy (MWh)
    - Number of hours shown
      - Efficiency need not be included as the maximum continuous energy already accounts for it

The Status Quo – Market Participation Pathways

- **Under the CAISO Tariff, a hybrid resource is defined as a Mixed-fuel Resource with a single Resource ID at a single Point of Interconnection (POI)**
  - The hybrid resource is visualized as a single asset, with all its components behind the POI being co-optimized through bids by the SC
  - The ISO does not provide dispatch instructions to each of the underlying components; instead providing instructions to be met by the combination of said components
- **In contrast, a co-located resource is defined by the CAISO Tariff as a Generating Unit with a unique Resource ID that is part of a Generating Facility with other Generating Units**
  - The CAISO visualizes each of the components of the co-located asset separately and is able to issue distinct dispatch instructions to each of the elements

- For hybrid resources, the SCs may limit grid-charging through bids and the dynamic limit tool (DLT), expected to be live Fall 2022
- For co-located resources, the CAISO can and does issue grid-charging instructions to storage components
  - CAISO is working on an electable co-located functionality that would completely avoid grid-charging, but this function is not live yet

The Status Quo – Paired QC

- **The current NQC methodology for IFOM hybrid and co-located resources only contemplates the case in which the storage exclusively charges from on-site generation**
  - Total QC = Effective Storage QC + Effective Renewable QC
    - Effective Storage QC = the minimum of:
      - Energy production from the renewable resource until 2 hours before the net load peak, divided by four
      - The QC of the storage
    - Effective Renewable QC = the remaining renewable capacity, net of the capacity required to charge the battery, multiplied by the ELCC factor of the month

This methodology is not reflective of actual market participation rules, and it excludes several configurations:

- Most co-located resources, as they receive instructions that would require grid-charging
- Hybrid and co-located assets that want to be able to charge from the grid unrestrictedly (*i.e.*, negative Pmin in Masterfile)

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Solar plus storage value (100 MW solar + 100 MW/400 MWh storage)				
Month	**ELCC**	**Effective ES QC**	**Effective Ren QC**	**NQC**
January	0%	100	0.00	100.00
February	3%	100	0.68	100.68
March	4%	100	1.25	101.25
April	4%	100	2.17	102.17
May	6%	100	3.39	103.39
June	13%	100	7.61	107.61
July	14%	100	7.84	107.84
August	12%	100	6.56	106.56
September	11%	100	5.36	105.36
October	7%	100	2.95	102.95
November	6%	100	0.82	100.82
December	4%	95.25	0.00	95.25

Modifications under SOD

1. **Exceedance should replace ELCC as the methodology to determine energy from VER**
2. **An additive-based approach should be developed to cover an unrestricted grid-charging configuration**
3. **For paired resources, inclusion into the charging sufficiency evaluation should be dependent on their energy source:**
   - Resources that are charging with on-site renewable generation exclusively should not be part of charging sufficiency test
   - Resources that will have unrestricted grid-charging should be part of charging sufficiency verification

Modifications under SOD – 1. Exceedance

- **Exceedance should replace ELCC as the methodology to determine energy from VER**
  - Alignment between VER and hybrid counts is desirable
  - Exceedance is better suited to adequately estimate the energy output of a renewable asset over time
  - Discussions about the specifics of the exceedance level by resource class (wind and solar) are still in flux
    - CESA generally supports methodologies that value output over all hours, as opposed to solely in the net-peak hours

Modifications under SOD – 2. QC Method

- **The current methodology should be retained and applied for paired assets that charge exclusively from on-site renewable generation**
  - CESA staff expects this methodology will be preferred by most hybrid assets and all co-located resources that desire to participate under the CAISO's proposed electable co-located functionality
    - Total QC = Effective Storage QC + Effective Renewable QC
      - Effective Storage QC = the minimum of:
        - Energy production from the renewable resource, ***based on the applicable exceedance methodology***, ~~until 2 hours before the net load peak,~~ divided by ***the maximum continuous duration shown of the storage component***
        - The QC of the storage
      - Effective Renewable QC = the remaining renewable ***output in excess of that*** required to charge the battery, ***based on the applicable exceedance methodology***

Modifications under SOD – 2. QC Method

- **Unrestricted grid-charging**
  - Unrestricted grid charging implies that the CAISO will have full access to the output of VERs and the flexibility of the storage asset
  - In this case, there should be no penalty applied to the additive method, only capping the addition at the aggregate capability constraint (ACC)
    - Total QC = Min(Storage QC + Renewable QC, ACC)
  - Capping at the minimum of the sum or the ACC per hour will account for contractual considerations, such as partial RA or multiple off-takers

Modifications under SOD – 3. Sufficiency and Efficiency

- **With regards to the charging sufficiency verification framework, CESA recommends that, for the reasons enlisted at the beginning of this presentation, this process does not explicitly apply efficiency losses to the maximum continuous energy limit (MWh) linked to the storage resource**
  - Charge and discharge inefficiencies are already included into the maximum continuous energy limit
- **For paired resources, CESA proposes the following:**
  - For resources that are charging with on-site renewable generation exclusively:
    - QC method accounts for energy sufficiency
      - *Not part of charging sufficiency test*
  - For resources that will have unrestricted grid-charging:
    - QC method does not account for sufficiency
      - *Part of charging sufficiency verification*

Exclusively on-site charging?	Part of Sufficiency Verification?
Yes	No
No	Yes

Other Issues

1. **A paired project with partial deliverability should qualify for RA and have the energy derived from the generation component used for QC purposes**
   - The VER component should not receive any RA credit, the only benefit is that the storage does not count for charging sufficiency verification
2. **CESA proposes that an initial test should be devised to determine if LSE-by-LSE charging sufficiency verification for standalone storage is warranted**
   - This would be a system-wide test, as such no LSE would have to reveal their positions
   - If the initial energy test (IET) is insufficient, a sufficiency test per LSE shall be conducted

Other Issues – Partial Deliverability

- **The RA Reform Decision directs parties to consider counting rules for paired projects that have full deliverability for the storage component but Energy-Only status for the generation component**
- **For resources that charge exclusively from on-site generation, given that the energy from the generation component is only for charging the storage component, these projects should fully qualify for RA and have the energy derived from the generation component used for QC purposes**
  - These resources should not be subject to charging sufficiency verification, insofar as the configuration reliably allows sufficiency from the on-site energy-only asset
  - The VER component should not receive any RA credit, the only benefit is that the storage does not count for charging sufficiency verification

Other Issues – Charging Sufficiency Verification

- **The issue of partial deliverability creates an inequity relative to standalone storage, which may not demonstrate sufficiency with energy-only products**
- **To solve this inequity, CESA proposes that an initial test should be devised to determine if charging sufficiency verification for standalone storage is warranted**
  - The energy output of all standalone energy-only VERs will be estimated via the same exceedance methodology applicable to their RA-providing counterparts (*i.e.,* those with FCDS)
    - If the sum of all energy generation is expected to be enough to cover the charging needs of all standalone storage shown for RA, no further individual LSE charging sufficiency test is needed
      - This would be a system-wide test, as such no LSE would have to reveal their EO positions
    - If the energy is insufficient, a sufficiency test per LSE shall be conducted
      - If this occurs, the individual test would need to be passed using RA-providing excess energy above the energy requirements to charge the storage fleet
      - CESA is open to consideration of allocating a portion of the energy-only exceedance sum to LSEs as a credits